Non-technical Abstract

After going through a bone marrow transplant to treat their leukemia, some patients unfortunately experience a recurrence of their cancer. These transplant patients can occasionally be brought back into remission (disappearance of cancer) by administration of white blood cells from the same person that originally donated the bone marrow for the transplant. Although these donor white blood cells may eliminate the leukemia, they may also elicit severe side effects by reacting against the recipient's normal tissues. This process, called graft versus host disease (GvHD), can lead to the death of the transplant patient.

This study attempts to use a gene transfer method to alter the donated white blood cells so they can be killed and eliminated from the patient's body if they react against the patient's normal tissues. With the help of a disabled mouse virus, called vector, we will transfer a gene into the donor white blood cells to make them sensitive to a drug called ganciclovir (GCV) which is commonly used to kill Herpes virus infected cells, and is not harmful to normal parts of the body. The gene being transferred into donor white blood cells is called the "Herpes Simplex thymidine kinase" (TK) gene. This gene has been fused to another gene (CD34) to help the identification and purification of those white blood cells that have acquired this genetic material. The gene alone is not harmful to white cells, and no Herpes virus can be made by cells carrying it. Gene modified donor white blood cells that are infused into the transplant patient can attack the patient's leukemia, at the same time they may also cause life threatening GvHD. By inserting this CD34-TK gene, we hope to be able to eliminate these cells and mitigate GvHD if it develops.